

INFORMATION REPORT

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COUNTRY USSR(Georgian SSR)

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SUBJECT New Hydroelectric PowerPlant near Dviri

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SUPPLEMENT TO
REPORT NO.

1. The hydro power plant near Dviri ($41^{\circ}46'N/43^{\circ}16'E$), Georgian S.S.R., is on the northern bank of the Kura River bend, 4 to 4.5 km downstream from the Kura River bridge of Dviri. The plant was called "Gidro-Elektrostantsiya Dviri." It has been under construction since 1945.

2. The hydro power plant had a storage dam with locks and a feed canal. The canal was open for about 2,000 meters and continued for about 2,500 meters as a tunnel passing through a mountain opposite Dviri. A pressure pipe branching into three lines, led from the lower end of the tunnel to the three turbines of the power plant. The tailrace was about 100 meters long and emptied into the Kura River. A settlement was under construction southwest of the power plant. *

3. The power plant had three turbines of Swedish make and three American generators. According to Soviet workmen and fitters, the capacity of the completed plant was scheduled to be 60,000 kw.

4. Construction work on the storage dam, the canal, and the tunnel had been completed in June 1949. At the same time the power plant with turbine shop and transformer station was completed in rough brickwork. A turbine was put into operation for the first time on 21 December 1949 while the two other turbines were still being installed. The plant was scheduled to reach its full capacity early in 1950. **

5. In addition to other projects, the power generated by the hydro power plant was scheduled to be used for the electrification of the Borzhomi ($41^{\circ}51'N/43^{\circ}23'E$) - Dviri-Akhalkalaki ($41^{\circ}32'N/42^{\circ}59'E$) railroad line which was completed in 1946, for the power supply of the new coal mines in Akhaltsikhe, and for the Kutaisi ($42^{\circ}15'N/42^{\circ}42'E$) industries including the Opel Automobile Plant. High-tension towers, extending north from the power plant, had been installed. At the time of observation high-tension lines had allegedly already been built as far as Borzhomi.

6. The power plant was surrounded by a wooden fence, about 2 meters high, while the construction was under way. The entrance gates were guarded by plant guards armed with pistols, who checked identification cards.

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[redacted] Comment. For location sketch of this plant, see Annex 1. This sketch is based on an aerial photograph and on information from sources. The dam and the course of the open canal appear to be accurately identified. Some sources reported greater dimensions for the tunnel length and the distance of the power plant from Dviri than were indicated in Annex 1. Therefore, it is possible that the power plant is 500 to 1,000 meters further downstream than indicated, and that the tunnel is somewhat longer. The information as to the grade of the canal and the capacity of the turbines and generators is very vague. The grade of the open part of the canal was indicated by most sources to be very slight, i.e. 0.04 percent while the grade of the tunnel has been mentioned as being .40 percent. This would mean a total fall of about 11 meters from the reservoir to the water chamber. As to the information supplied on the turbines and generators, a capacity of 16,000 to 20,000 kw for each generator seems to be most probable considering the dimensions and the actual layout of the plant. One source learned from his fellow-workmen that each turbine had a capacity of 8,000 kw.

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[redacted] Comment. For sketch of the dam installation see Annex 2. The sketch is based on information of all sources. For layout sketch of the power plant see Annex 3.

{ Annexes: Sketches.

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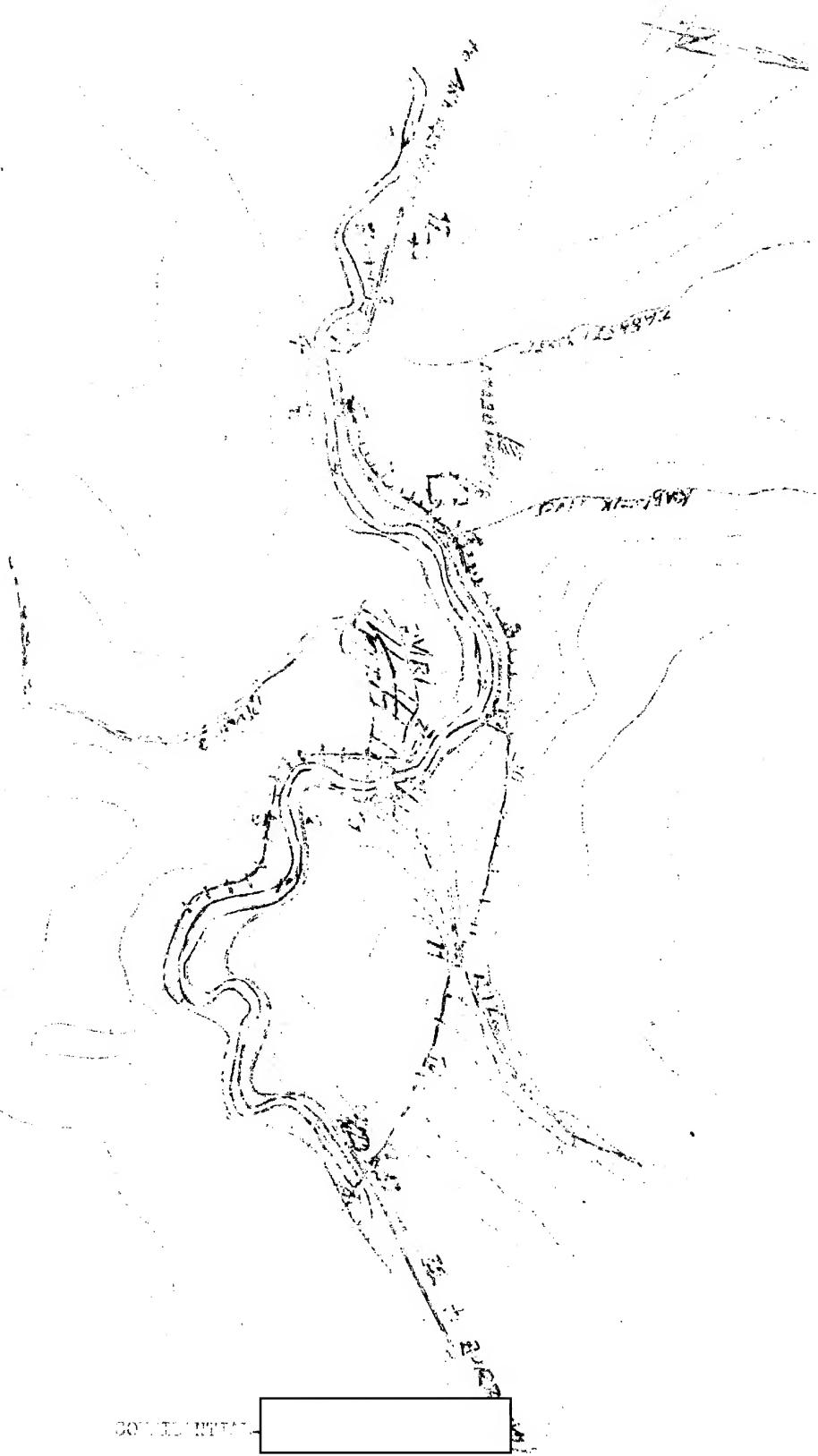
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Location: [redacted] or [redacted] or [redacted] or [redacted]

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Annex 1/1



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Annex 1

Legend:

1. Kura River. The width of the river was 50 to 60 meters near Dviri. At mean water level the river depth was 2 to 3 meters at the construction site of the dam.
2. Borzhomi - Dviri - Alhaltsikhe highway, which was a continuation of the Georgian military highway coming from Tbilisi. It was asphalted and was 6 to 8 meters wide.
3. Borzhomi - Dviri - Alhaltsikhe single-track railroad line. Since late in 1947 work has been under way to prepare for the electrification of this line.
4. Railroad bridge across the Kura River. This was a steel structure, about 120 meters long.
5. Road bridge across the canal which was built in 1946/1947 and was a concrete bridge, about 40 meters long, 6 meters wide, and had a carrying capacity of 25 tons.
6. Buttressed dam with shutters. The dam installation can be seen from a point about 300 meters below the railroad bridge (see also Annex 2.)
7. Canal which started 30 to 50 meters above the dam and led to the tunnel entrance. This canal was almost parallel to the highway, at a distance varying from 50 to 200 meters north of the highway. The canal had a trapezoidal cross section with a base width of 4 to 5 meters, an upper clear width of 6 to 16 meters depending on the terrain and a depth of 4 to 10 meters depending on the terrain. The canal walls were of rubble and were faced with steel reinforced concrete. Near the upper end of the canal, between the road bridge and the Kura River, was a lock damming the water flow to the canal. In the center of the canal was a pillar, about 6 meters high with two vertical shutters which were 3 meters high and 1 meter wide.
8. Bridge for debris and mountain water. There were three such bridges crossing the open canal. Along the ridge above the canal there was another canal which prevented the pollution of the main canal by collecting debris and mountain water and conducting them across the bridges directly into the Kura River.
9. Mud canal (Schlammkanal), leading from the rain canal into the Kura River about 30 meters above the tunnel entrance.
10. Tunnel. The cross section of this tunnel was semi-circular in its upper part and trapezoidal in its lower part. Its medium width was about 1/4 meters and its height from the bottom to the ceiling was 6 to 8 meters. There were catwalks on both sides of the canal. The tunnel walls were made of iron concrete, were very solid, and ranged up to 1.5 meters in thickness. Semi-circular concrete arches, 4 to 5 meters in diameter and 1 meter long, were used for the construction of part of the ceiling. When the tunnel project was under construction a horizontal exploratory gallery, which was later walled, was driven about 750 meters into the mountain about 1,300 meters from the tunnel entrance, and two vertical shafts, later concreted inside and covered on top, were sunk to the projected tunnel. The first shaft, about 200 meters from the tunnel entrance, was about 50 meters deep and was about 5 meters square. The other shaft, located downstream from the first shaft, was about 20 meters deep.
11. Open stretch of the canal, extending about 400 meters through a valley.
12. Water chamber and pipe line.
13. Power plant with turbine chambers, switchgears and transformer station. (See also Annex 3).

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Annex 1/3

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14. Railrace.
15. High-tension line.
16. Settlement.
17. Convict camp, which had been an internment camp for Upper Silesians until 1946.
18. PW Camp No 7181/3, formerly 236/11 and 7236/6. This camp was closed down on 21 December 1949, Stalin's birthday, and it was planned to billet Soviet convicts in this camp. 38 green painted wooden barracks buildings, each 30 x 8 meters.
19. Road bridge across the Kura River in Dviri. This was a steel bridge made of double T girders and was about 10 meters wide.
20. Dviri railroad station.

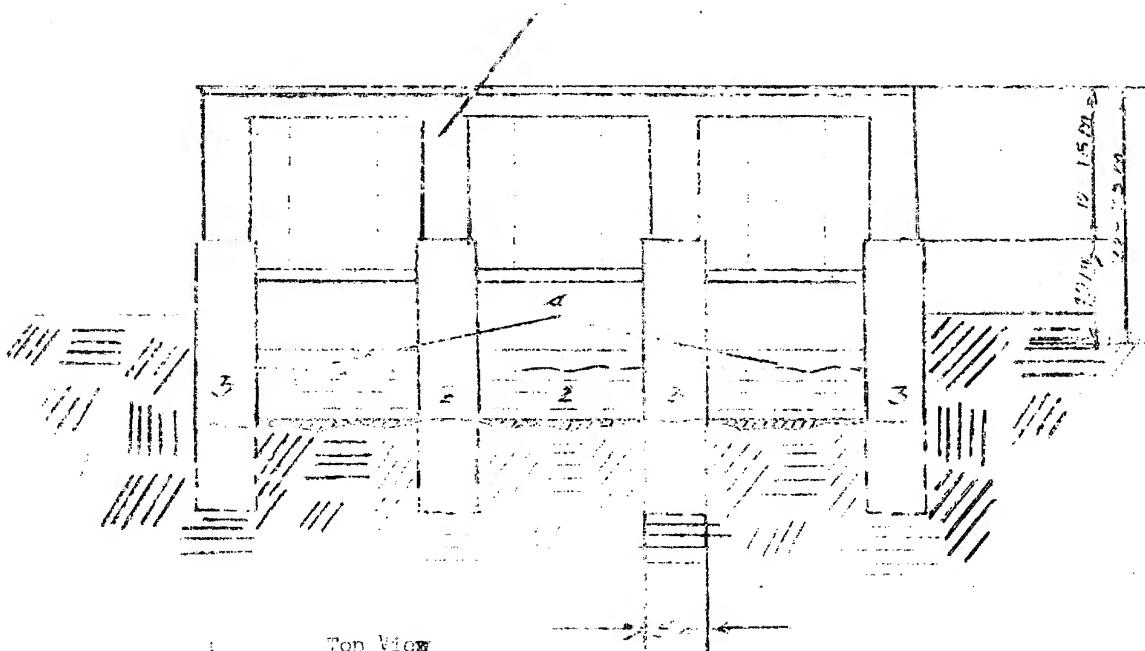
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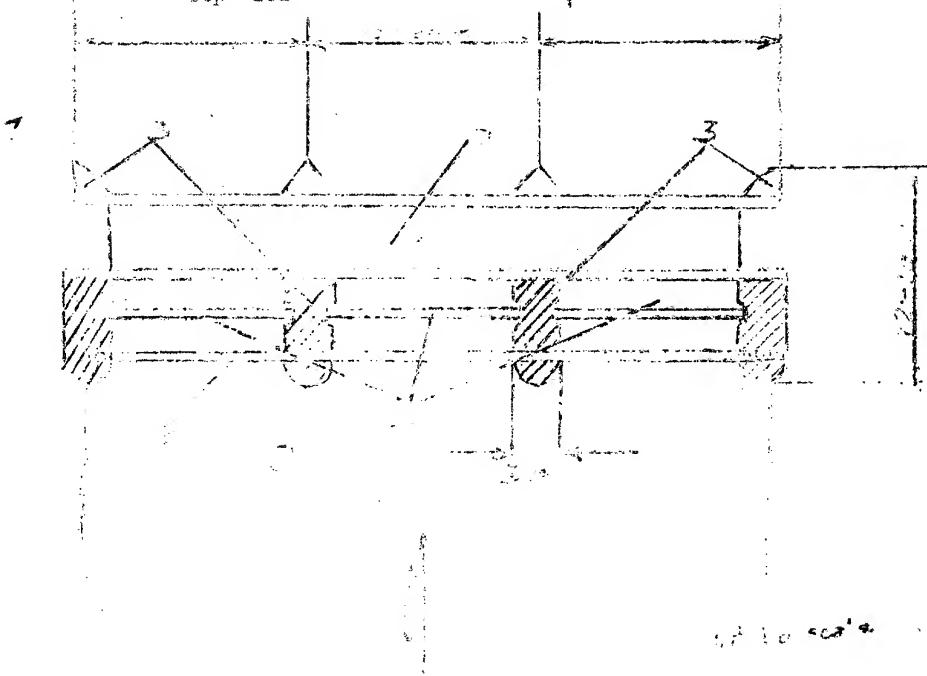
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Method of the Puttress and Keen

Front View



Top View



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Annex 2/2

Legend:

1. Embankment.
2. Kura River.
3. Piers made of ferroconcrete. There were probably four piers driven 6 to 8 meters into the riverbed. The side piers were connected with the embankment and served as shuttler piers for the shutters. The piers were about 10 meters high, above the water level, and were placed at uniform intervals of 15 to 20 meters. The upstream end of the piers was rounded-off. The piers were 12 to 15 meters long, 5 meters wide at the base of the pier and 3 meters wide on top. There were vertical grooves at the side of the piers for the steel shutters.
4. Three shutters.
5. Gate-like ferroconcrete superstructures placed on the piers. They were 10 to 15 meters high and supported the lifting apparatus used to raise the shutters.
6. Catwalk, about 1 meter wide, for servicing.
7. Road bridge, about 5 meters wide.

The dam bottom was built by the use of caissons. The dam was constructed of concrete and iron concrete. The overall length of the dam was 60 to 80 meters and the overall height above the water level was 20 to 25 meters.

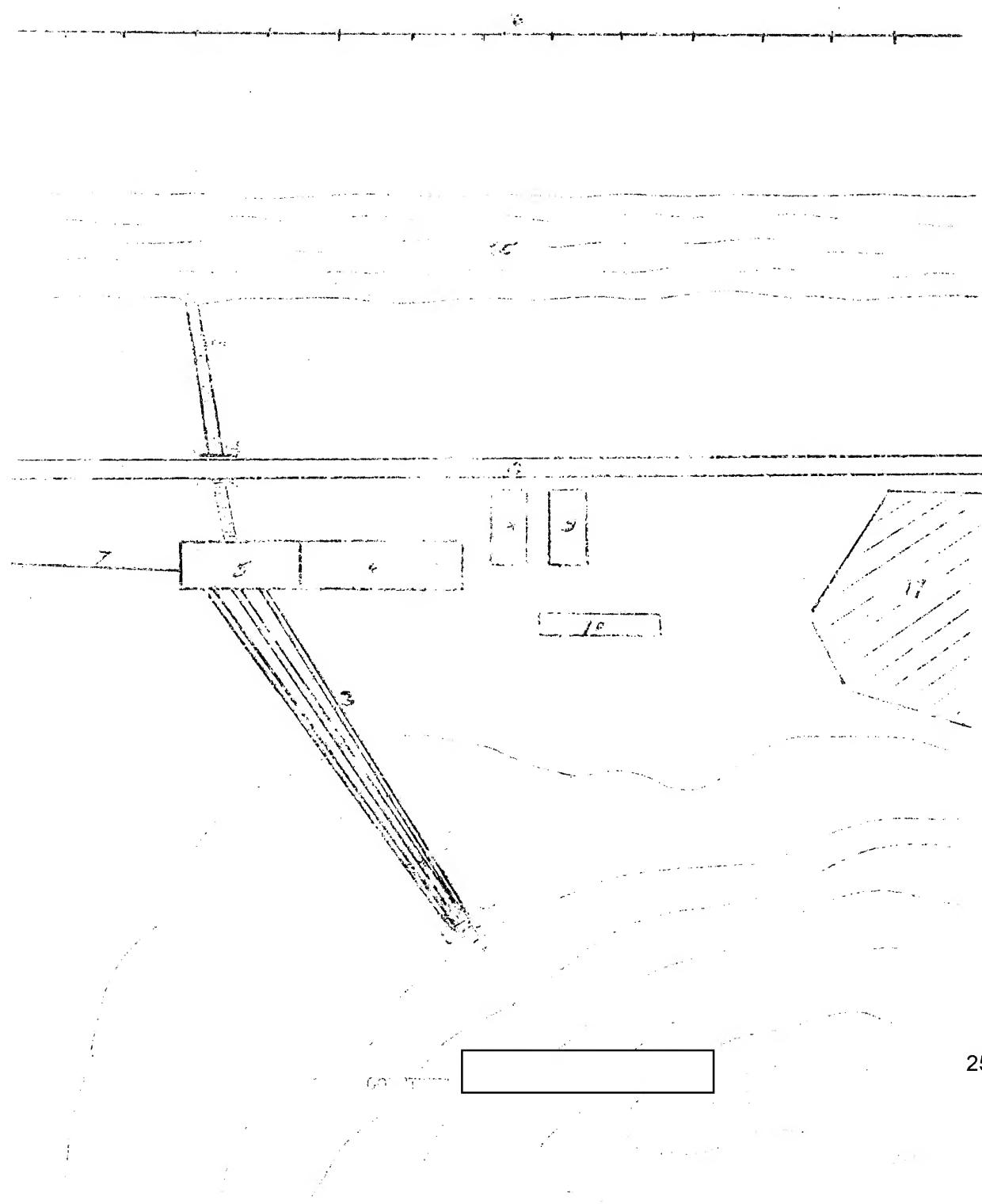
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Layout of Site of Power Plant

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Annex 3/2

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Legend:

1. Water chamber located at the end of the tunnel. The concrete basins or chambers measured 25 x 5 meters.
2. Solid concrete base for pipes.
3. Pressure pipe line. There was a main pipe, 10 meters long, with a diameter of 4.5 to 5 meters, leading from the water chamber. A distributor for the pressure pipes was welded to the main pipe. The three pressure pipes were covered with an insulating layer. They led to the three turbine houses in the power plant. The pressure pipe line consisted of welded seamless pipe sections 8 meters long, with a diameter of about 2.5 meters and a wall thickness of 15 mm. The total length of the pressure pipe line was 150 to 200 meters. The fall from the water chamber to the turbine houses was about 30 meters.
4. Throttle valves. There was a manually operated throttle valve on each pipe line about 40 meters below the tunnel exit. About 3 meters beyond this was an electrically controlled, oil pressure throttle valve on each pipe.
5. Power plant. It was a two-story stone structure with a flat roof. It covered an area of 50 x 20 meters and was from 15 to 20 meters high. The first floor was a concreted cellar construction, from 8 to 10 meters high. There were three turbines which were of Swedish make. The turbine foundations were 4 meters square. The diameter of the water wheel was about 1,300 mm. The height of the wheel was from 500 mm to 600 mm. The height of the turbine shaft to the generator was 3.5 to 4 meters and the diameter of the shaft was 100 mm. The generator was of American make and was about 2 meters high and 3 to 4 meters long. The maximum output was 20,000 kws. Switchgears, cable rooms and technical offices were located on the upper floors of the turbine house.
6. Transformer station. Adjoined the power plant to the southwest side. It was an open air station and covered an area of about 35 x 20 meters. Transformers and instruments were of Russian make. There were two transformers, each 2.5 meters long, 1.5 meters wide and 2.5 meters high.
7. High-tension line. Steel towers with insulator chains which were 1 meter long were set up in the direction of Borzhomi.
8. Garage. A wooden structure, about 35 x 15 meters.
9. Storehouse. A wooden structure, about 35 x 15 meters.
10. Building, 50 x 8 meters, housing an instrument shed, carpentry shop, and forge.
11. Workers' settlement comprising 12 to 14 houses, including the administration building, the clubhouse, and the school.
12. Highway.
13. Concrete road bridge across the tailrace. This bridge was about 20 meters long and 6 meters wide.
14. Tailrace. It was planned to extend this canal in the direction of Borzhomi and to set up additional turbines at a distance of several kilometers. The projected course of the canal was surveyed during the time of observation.
15. Kura River.
16. Railroad Line.

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